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NO DRAWINGS

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(54) IMPROVEMENTS IN OR RELATING TO BREAD

(71) We, UENO FINE CHEMICAL INDUSTRIES LTD., a Japanese body corporate of 2—31, Koraibashi, Higashi-ku, Osaka, Japan, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of making bread, and to a dough for use in the method.

In making bakery products, and especially the yeast-leavened bread, it has been the practice to use 0.2—0.4%, based on the flour, of calcium propionate. One of the reasons for using this compound is to prevent the bread from being subjected to the undesirable consequences of the rope bacterium and another is to prevent the damage caused to the bread by moulds.

The damage caused by these microorganisms and their prevention will be more fully described below. The rope (which results in the bread becoming worthless) is caused by the growth of microorganisms of the *Bacillus* genus having strong resistance to heat. Further, since the contamination of the bakery plant by for example *Bacillus mesentericus* and *Bacillus Subtilis* is extremely tenacious, the contamination by these microorganisms is most feared by those engaged in baking.

In the past, the addition of acetic acid or acid phosphates and the use of an acid dough step have been adopted to overcome the above problems. That is, most of the methods employed were those which consisted in reducing the pH of the dough to close to that at which the growth of bacteria of the genus *Bacillus* takes place. This method, however, had the drawback that the finished product would be adversely affected if the pH was reduced too much. Thus this method is not fully satisfactory.

However, with the appearance of the propionates in recent years, the problem of ropy bread was said to be substantially solved. There still remained some drawbacks, however. For example, calcium propionate affects the normal leavening action of yeast, and particularly in the case of the recently developed advanced continuous process having a relatively short leavening period, the undesirable effects that appear cannot be ignored. Again, if calcium propionate is added in an amount exceeding 0.2% it gives off an objectionable odour.

Turning now to the mould problem, immediately subsequent to baking no mould at all exists in the bread. However, in its subsequent handling, i.e. in the removal from the pan, cooling, slicing, wrapping and transporting steps, the opportunities in which bread can become contaminated are very numerous. In view of the time it stays at a retail store and the time that elapses before it is finally consumed by the consumer, it must be capable of being kept for at least one week without spoiling.

Whether or not mycotoxins such as aflatoxin occur in mouldy bread has not been fully investigated as yet, but it must be considered a duty of the foodstuff producer to provide the consumer with bread which is not contaminated with mycotoxins. Although calcium propionate is at present usually added to white bread in an amount of about 0.2%, based on the flour used, this amount does not possess adequate preservative effects.

The reason why calcium propionate is used in the above concentration is because the addition of more results in an aggravation of the undesirable effects encountered during the normal leavening of yeast; the flavour of the product is also adversely affected. Hence, since a satisfactory result cannot be obtained by the use of calcium propionate in its maximum useable amount, the rate of returned bread has shown no improvement in the United States of America.

It has been found that bread having good

preserving properties can be prepared by incorporating an acetate and a coated acid compound.

The invention provides a method of making bread in which there is used a flour-containing dough comprising (1) 0.2 to 0.5% by weight, relative to the flour in the dough, of an acetate, and (2) an acid compound which is (a) an organic acid, (b) an acid salt of an organic acid or (c) an acid salt of an inorganic acid, and which is solid at room temperature, the acid compound being coated with a coating agent which is solid at room temperature but which melts under the conditions of baking of the dough, and the amount by weight, relative to the weight of flour in the dough, of (a), (b) and (c) present being, respectively, at least 0.03%, at least 0.06% and at least 0.045%.

The effect of the antimicrobial organic acids such as acetic acid, propionic acid and sorbic acid, on microorganisms varies considerably according to the pH. This is because the antimicrobial activity depends upon the undissociated molecules of the organic acid. Thus, the antimicrobial activity increases when the pH is on the acid side, the opposite being true when the pH is on the alkaline side. For example, when, the acetate added is sodium acetate alone, no matter how high its concentration is raised, preservative effects cannot be expected at all, since the pH of the dough as well as that of the bread becomes higher as the concentration of the sodium acetate is raised. Hence, when an organic acid is used as a preservative for foods, it is most effectively used and is more economical when the pH is low. When considered from such a viewpoint, the method of adding acetic acid instead of an acetate is clearly promising, but as previously noted, this method has already been tried.

However, this method has shortcomings in that the pH of the dough as well as bread is lowered and also the odour of acetic acid is imparted to the bread. Further, it is necessary in making bread that the pH of the dough is not reduced too far since, if it is, the gluten and the texture and volume of the final product are affected. However, if the bread has a low pH, the acetate will have fully shown its activity. The development of a preservative meeting the foregoing requirements has been investigated. As a result, it was found that pronounced preservation effects as well as an improvement in the quality of the bread could be obtained by using an acetate and a coated crystalline acid compound obtained by coating a solid acid compound with a solid coating agent [for example an animal or vegetable fat or oil monoglyceride, diglyceride or wax (e.g. a paraffin wax) or a mixture thereof] which melts upon being heated. The coated acid compound, being isolated from the dough system, does not change at all during the leavening of the dough, but during the baking stage the coating agent surrounding the solid acid compound melts and the acid substance is released and acts as a very effective acid in quickly reducing the pH of the bread.

One of the important features of the invention method is the complete elimination of the strange odour in the bread caused by calcium propionate. When calcium propionate is added in an amount exceeding 0.2% by weight, a peculiar odour and sourness were imparted thus rendering the bread unpalatable to some consumers. This was especially the case in Japan. Hence, the maximum allowable amount was about 0.1%.

With sodium acetate, its odour is hardly detectable in amounts up to 0.5% by weight; the odour of sodium acetate is in any case, unlike that of propionic acid, not unpleasant but rather has a pleasing acidity and flavour.

Another important feature of the method is that the fermentation is not retarded as much as with calcium propionate. In making bread using the method of the invention, an increase in the loaf volume of the product over that from the control experiment is demonstrated. With a propionate, the final proof time must be prolonged for obtaining the usual fermentation and loaf volume, but this is not necessary in the method of the invention and bread of a greater loaf volume can be still obtained. The reason for this is as follows. Since the pH of the acetate in the dough is high, the antibacterial activity cannot be demonstrated at all and hence there is no effect on the yeast. Thus, it is presumed that normal fermentation takes place and along with the dissolution of the coated acid an increase in the loaf volume is brought about during the baking as a result of some factor that contributes to an increase in the volume.

Suitable acid compounds are organic acids such as fumaric acid, citric acid, malic acid, succinic acid, adipic acid and tartaric acid, or their acid salts such as monosodium fumarate, monosodium citrate, monosodium malate, monosodium succinate, monosodium adipate and monosodium tartrate. Suitable inorganic acid salts are sodium monohydrogen orthophosphate, calcium monohydrogen orthophosphate, sodium metaphosphate and potash alum [$Al_2(SO_4)_3.K_2SO_4.24H_2O$].

In the method, the acetate is used in an amount of 0.2—0.5% by weight relative to the flour (e.g. wheat) used in the bread mix. When the amount is less than 0.2% by weight, no preservative effects occur. On the other hand, when the amount exceeds 0.5% by weight, the fermentation of the yeast is hindered and the quality of the bread deteriorates. Further, at a concentration greater than that indicated, the bread making property of the wheat flour gluten is impaired so that a bread with poor texture is obtained. The organic

acid must be used in an amount of at least 0.03% by weight relative to the flour (e.g. wheat) of the bread mix. When the amount is less than 0.03% by weight, no preservative effects are demonstrated. On the other hand, the acid salt of an organic acid must be used in an amount of at least 0.06% by weight relative to the flour. No preservative effects are demonstrated when the amount is less than 0.06% by weight. With the acid salts of inorganic acids, the amount used must be at least 0.045% by weight based on the flour. No preservative effects occur when the amount is less than 0.045% by weight.

The amount of the organic acid, the acid salt of an organic acid, or the acid salt of an inorganic acid required becomes less as the acid strength of these compounds increases. Hence, the above lower limits are the minimum amounts for strongest acid compounds in each class. That is, for the organic acid, the minimum amount of 0.03% by weight is for fumaric acid, for the acid salt of an organic acid, the minimum amount of 0.06% by weight is for monosodium fumarate, and for the acid salt of an inorganic acid the minimum amount of 0.045% by weight is for alum. In the case of calcium monohydrogen orthophosphate and sodium monohydrogen orthophosphate the minimum amounts to be added are 0.06% and 0.15% by weight, respectively.

The coating of the acid compound can be carried out as follows. A coating agent consisting predominantly of a hardened oil is heat-melted and held at 70—80°C. An organic acid of an acid salt comminuted to a particle diameter of 10 micron or less is added to the melted coating agent, after which a surfactant is also added, if necessary. This is followed by thoroughly mixing and dispersing the mixture using a homogenizer. This mixture is then sprayed into a chamber at below 40°C., using a rotating disk type spraying apparatus to obtain a powder product of particle diameter less than 500 microns, and preferably 50—300 microns. The coating agent comprises one or more substances which can coat acids or acid salts and must naturally be tasteless and odourless as well as harmless from the standpoint of food hygiene. Thus, the hardened oils or mono- or diglycerides of fatty acids and waxes (japan wax, beeswax or paraffin wax) are preferred. The coating agent is usully used in an amount of two to four times that of the acid or acid salt.

In the invention, since the acid is in a coated state during the fermentation of the bread dough, the acetate does not affect the fermentation which proceeds normally.

Further, even though a large quantity of the coated acid is added, substantially no change in physical properties of the dough results; the acid is released during the baking of the bread to give a product of low pH, thus making it possible to make bread of high preservability and having a satisfactory flavour, volume and texture resulting from the normal fermentation of the dough.

The term "acetate", as used herein, refers to the edible and harmless salts and includes for example sodium, potassium, calcium, magnesium and ammonium acetates.

The invention is illustrated by the following Examples, wherein unless otherwise noted, the parts and percentages are by weight.

Examples 1 and Controls 1—5

The dough mix comprised the components shown in Table 1.

Table 1

	Sponge Dough	Remixed Dough
Wheat flour	70 parts	30 parts
Yeast	2	
Yeast food	0.1	
Common salt		1.8
Sugar		4
Shortening		4
Water	40	20

First, after kneading the sponge dough for 2 minutes at a low speed, it was fermented at 28°C. for 4 hours. The remixing operation was then carried out for 6 minutes, at which time the salt, sugar and shortening as well as the preservative if used were added. After a second fermentation lasting for 30 minutes, the dough was divided into portions each 150 grams in size and a first proofing time of 15 minutes was allowed. Each of the portions of dough was placed in a mould and finally proofed for 40 minutes at 37°C. in a rotary final proofing oven. Next, baking was carried out for 20 minutes at 230°C. in a rotary oven. Six loaves of the product were withdrawn. Of these, three loaves were used and following tests were carried out: a volume measurement after a lapse of one hour, and a taste test, measurement of pH and measurement of the crumb hardness by means of a bakers' compressimeter after a lapse of 12 hours. Five slices from each of the three remaining loaves, i.e. a total of 15 slices, were obtained and each of these slices of bread was placed in a polyethylene bag and sealed. The bags were stored in a constant temperature chamber at 30°C. and observations were made of spoilage due to mould, that results with the passage of time.

Table 2 shows the effects on the quality of the product when experiments were carried out when the additives indicated were used as preservatives.

TABLE 2

Experiment	Additive	pH		Condition of Product: Volume of bread (ml)	Condition of Product: Crumb hardness (g) 12 hr	Tube Test	
		Dough	Product			Flavour and taste	Hardness
Control 1	preservative not added	5.62	5.40	706	76	good	normal
Control 2	calcium propionate 0.2%	5.62	5.42	690	75	acid adour, sour	normal
Control 3	acetic acid 0.3%	5.48	5.32	688	84	strong acid odour	hard
Control 4	sodium acetate 0.4%	5.70	5.40	726	76	good	normal
Control 5	sodium acetate 0.4% plus 50% lactic acid 0.2%	5.40	5.28	700	78	good	slightly hard
Example 1	sodium acetate 0.4% plus coated fumaric acid 0.2%	5.68	5.28	748	73	good	normal

When sodium acetate and the coated fumaric acid were used together, the pH of the dough did not drop, but a considerable drop took place in the pH of the product bread. While the volume of the bread became small in the experiments in which proportionate and acetic acid were used, as opposite tendency was noted in the case of the experiment in which sodium acetate was added. As to the hardness of the crumbs, it was seen that the hardness was high in the case where acetic acid was added, (i.e. when the pH was low from the dough stage). On the other hand, the results of the taste test showed that when calcium propionate was added in an amount of 0.2 %, a peculiar propionic acid odour was given off by the bread, which moreover had an unpleasant sour teste. Now, when only acetic acid was added, a peculiar acetic acid odour and a strong acidity occurred. However, in the case where sodium acetate was added, practically no odour was noticed. Moreover, when the coated fumaric acid was added, an acid odour could not be detected, and the bread had a good flavour. When sodium acetate was used with other acids, the volume was not increased even when there was used lactic acid which reduced the pH from the outset.

Further, as regards the preservative effects, the results shown in Table 3 show that an adequate effect is obtained by the use of sodium acetate and the coated fumaric acid.

The product obtained using sodium acetate and fumaric acid compared favourably in other respects with the product obtained in Control I (wherein a preservative was not added). It was possible to obtain comparable preservative effects without being troubled at all by the odour that results from the use of propionate.

TABLE 3

Experiment	Conditions of Experiment	Number of Days Kept					
		2	3	4	5	6	7
Control 1	preservative not added	10/15**	15/15				
Control 2	calcium propionate 0.2%				2/15	8/15	15/15
Control 3	acetic acid 0.3%			4/15	11/15	15/15	
Control 4	sodium acetate 0.4%	9.15	15/15				
Control 5	sodium acetate 0.4% plus 50% lactic acid 0.2%				5/15	8/15	15/15
Example 1	sodium acetate 0.4% plus coated fumaric acid* 0.2%				4/15	9/15	15/15

* Composed of 33% of fumaric acid and 67% of a hardened oil.

** The numerical values in the Table have the following meaning. For example, the figure 10/15 denotes that, of the 15 slices tested, 10 were spoiled.

Example 2 and Control 6

Two kg of wheat flour, 40 grams of yeast, 36 grams of common salt, 80 grams of sugar, 80 grams of shortening, 0.15 % (based on the wheat flour) of calcium propionate and 1240 ml of water were kneaded at low speed for 8 minutes with a mixer.

The resulting dough was divided into 150-gram portions, which were submitted to a first fermentation for 90 minutes at 30°C., followed by degassing, then to a second fermentation for 45 minutes at 30°C., followed by degassing, then first proofing for 15 minutes and thereafter moulding in a moulder and placing in the bread moulds. These were then held in an automatic rotary final proofing chamber at 37°C. for 50 minutes and then baked for 20 minutes at 30°C. in a rotary oven to give twenty loaves of bread having a volume of about 670 ml each.

Separately, twenty loaves of bread were obtained in the same manner using the same wheat flour but adding 0.3 % of sodium acetate and 0.1 % of coated fumaric acid (both quantities based on the wheat flour).

The former bread (Control 6), i.e. that in which calcium propionate was added, and the latter (Example 2), i.e. that in which sodium acetate and the coated fumaric acid were added, were paired and submitted to a taste test by 15 persons. To the question as to which had a better flavour, those that flavoured the former numbered only two while the rest showed their preference for the latter. Hence,

it was shown that the bread in which sodium acetate and coated fumaric acid were used was superior to that which used calcium propionate. This was followed by placing the remaining five loaves of each of the breads in separate polyethylene bags, which were then sealed and held at 26—32°C. with the following results. On the sixth day, one loaf of the bread in which calcium propionate was used and two loaves in which sodium acetate and coated fumaric acid was used became mouldy, while on the seventh day one loaf in each of the two classes of breads became mouldy and on the eight day all of the loaves, i.e. five loaves of both classes became spoiled. Hence, this test demonstrated that there was practically no difference in preservative effect between the two types of bread additives.

Examples 3—6 and Controls 7—14

Four hundred grams of wheat flour, 16 grams of shortening, 8 grams of yeast, 7.2 grams of common salt, 16 grams of sugar, 0.8 gram of a fermentation accelerator and 248 ml of water were used and, after mixing for 8 minutes, the resulting dough was divided in three 150-gram portions. After a first fermentation (30°C., 15 minutes) and a final proofing (30°., 15 minutes) followed by moulding with a National moulder, the dough was placed in bread moulds and finally proof for 50 minutes at 37°C. and a humidity of 96 %. This was followed by baking the dough in a rotary oven for 16 minutes at 230°C. The preservative was added at the time the dough was mixed. Three loaves of bread were obtained from each experiment. Seventeen hours later, two slices of bread were taken from each loaf, making a total of six slices. These were sealed in polyethylene bags and kept in a 30°C. constant temperature chamber. Twice daily the bread was studied for the appearance of mould. The slice of bread was determined to have been spoiled upon the appearance of even a single mouldy spot.

As a result of the preservation test, the results shown in Table 4 were obtained. When a variance analysis of the results given in the Table 4 was carried out with respect to preservative activity, the error as regards the amount added of the two chemicals was 1 %. Thus, it is seen that, while sodium acetate alone has no effect even if it is added in amounts up to 0.45 %, its preservative activity demonstrates an abrupt increase starting from an addition of 0.3 % when coated fumaric acid in an amount of 0.1—0.2 % (since the fumaric acid is coated with a twofold amount of a hardened oil, the amount of fumaric acid equals 0.03—0.06 %) is also used. Further, not much can be expected as far as the enhancement of the effectiveness of sodium acetate is concerned by adding it in an amount exceeding 0.3 %, i.e. by increasing its concentration.

TABLE 4

Amount added of coated fumaric acid** (%)	Amount Added of Sodium Acetate (%)			
	0	0.15	0.3	0.45
0	* 3.75 a_1 3.5 a_2 3.75 a_3 average b 3.67	3.5 3.5 3.25 — 3.42	3.5 3.5 3.5 — 3.5	4.0 3.5 3.5 — 3.67
	(Control 7)	(Control 8)	(Control 9)	(Control 10)
0.1	4.1 3.75 3.5 — 3.75	4.0 4.0 3.75 — 3.75	4.5 5.5 5.5 — 5.17	4.25 5.0 6.0 — 5.08
	(Control 11)	(Control 12)	(Example 3)	(Example 4)
0.2	3.5 3.75 4.0 — 3.75	3.75 3.5 4.0 — 3.75	4.5 5.25 5.5 — 5.08	4.27 5.25 5.0 — 5.0
	(Control 13)	(Control 14)	(Example 5)	(Example 6)

* The figures in the table indicate the number of days that the bread kept without being spoiled by mould, the *a* value being the average of two slices, the a_1, a_2, a_3 being the foregoing value for each of the three loaves, and the overall average being indicated as the *b* value.

** The coated acid has a twofold amount relative to the acid of a coating of a hardened oil.

Examples 7—10 and Controls 15—17

Bread was made in accordance with the method described in Example 1, adding to the dough the acetates and fumaric acid coated with various coating agents as shown in Table 5. The pH of dough as well as the product and the condition of the product in these cases were tested as in Example 1 and the results obtained are also shown together in Table 5. Again, slices were taken from the several loaves and tested for their preservative effects as in Example 1, with the results shown in Table 6.

TABLE 5

Experiment	Additive	pH		Condition of product	Taste Test	
		Dough	Product	Volume of bread (ml)	Flavour and taste	Hardness
Control 15	preservative not added	5.60	5.40	708	good	normal
Control 16	calcium propionate 0.2%	5.62	5.42	688	acid adour, sour taste	normal
Control 17	calcium acetate 0.4%	5.62	5.42	720	good	normal
Example 7	sodium acetate 0.4% plus coated fumaric acid *1 0.15%	5.68	5.26	724	good	normal
Example 8	sodium acetate 0.4% plus coated fumaric acid *2 0.2%	5.68	5.26	724	good	normal
Example 9	sodium acetate 0.4% plus coated fumaric acid *3 0.2%	5.66	5.25	720	good	normal
Example 10	sodium acetate 0.4% plus coated fumric acid *4 0.25%	5.68	5.25	724	good	normal

*1 Fumaric acid coated with a hardened oil in a ratio of 1 : 2.

*2 Fumaric acid coated with monostearin in a ratio of 1 : 3.

*3 Fumaric acid coated with a mixture of monostearin and a hardened oil in a ratio of fumaric acid : monostearin : hardened oil of 1 : 2 : 1.

*4 Fumaric acid coated with a hardened oil in a ratio of 1 : 4.

TABLE 6

Experiment	Additive	Number of Days Kept						
		2	3	4	5	6	7	8
Control 15	preservative not added	10/15	15/15					
Control 16	calcium propionate 0.2%				2/15	8/15	10/15	15/15
Control 17	calcium acetate 0.4%	10/15	15/15					
Example 7	sodium acetate 0.4% plus coated fumaric acid *1 0.15%				1/15	7/15	10/15	15/15
Example 8	sodium acetate 0.4% plus coated fumaric acid *2 0.2%				1/15	8/15	9/15	15/15
Example 9	sodium acetate 0.4% plus coated fumaric acid *3 0.2%					8/15	10/15	15/15
Example 10	sodium acetate 0.4% plus coated fumaric acid *4 0.25%					7/15	10/15	15/15

*1 — *4 Of same meaning as in Table 5.

It can be seen from Tables 5 and 6 that the volume properties and preservability of the product is good when the amount of the coating agent is used such that the ratio of the coating agent to the acid is 2—4 : 1.

Examples 11—18 and Controls 18 and 19

Bread was made as in Example 1 using the preservatives listed in Table 7. The effects on the product are shown in Table 7.

TABLE 7

Experiment	Additive	Dough	Product	Volume of bread (ml)	Taste Test	
					Flavour and taste	Hardness
Control 18	preservative not added	5.62	5.38	710	good	normal
Control 19	calcium propionate 0.2%	5.64	5.40	702	acid odour sour taste	normal
Example 11	sodium acetate 0.4% plus coated citric acid 0.2%	5.60	5.26	724	good	normal
Example 12	sodium acetate 0.4% plus coated malic acid 0.17%	5.62	5.28	728	good	normal
Example 13	sodium acetate 0.4% plus coated succinic acid 0.15%	5.62	5.28	726	good	normal
Example 14	sodium acetate 0.4% plus coated tartaric acid 0.2%	5.62	5.26	726	good	normal
Example 15	sodium acetate 0.4% plus coated calcium monohydrogen ortho phosphate 0.18%	5.62	5.26	724	good	normal
Example 16	sodium acetate 0.4% plus coated adipic acid 0.19%	5.62	5.26	728	good	normal
Example 17	sodium acetate 0.4% plus coated sodium metaphosphate 0.45%	5.60	5.25	726	good	normal
Example 18	sodium acetate 0.4% plus coated alum 0.13%	5.60	5.25	726	good	normal

Next, the preservative effects of the bread obtained in the foregoing experiment were tested as in Example 1 with the results shown in Table 8.

TABLE 8

Experiment	Additive	Number of Days Kept						
		2	3	3	5	6	7	8
Control 18	preservative not added	12/15	15/15					
Control 19	calcium propionate 0.2%					5/15	11/15	15/15
Example 11	sodium acetate 0.4% plus coated citric acid 0.2%					7/15	13/15	15/15
Example 12	sodium acetate 0.4% plus coated malic acid 0.17%					4/15	12/15	15/15
Example 13	sodium acetate 0.4% plus coated succinic acid 0.15%					4/15	13/15	15/15
Example 14	sodium acetate 0.4% plus coated tartaric acid 0.2%					3/15	10/15	15/15
Example 15	sodium acetate 0.4% plus coated calcium monohydrogen ortho phosphate 0.18%					5/15	10/15	15/15
Example 16	sodium acetate 0.4% plus coated adipic acid 0.19%					5/15	10/15	15/15
Example 17	sodium acetate 0.4% plus coated sodium metaphosphate 0.45%					5/15	9/15	15/15
Example 18	sodium acetate 0.4% plus coated alum 0.13%					4/15	11/15	15/15

Note: The acids or acid salts were coated in all cases with a twofold amount of a hardened oil. The amount added of the acids or acid salts were in all cases such that their pH reducing capacity corresponded to that of 0.05% of fumaric acid.

Examples 19—20 and Controls 20—22

Bread was made as in Example 1 using the preservatives listed in Table 9. The effects on the quality of the bread were as shown in Table 9.

TABLE 9

Experiment	Additive	pH		Volume of bread (ml)	Taste Test	
		Dough	Product		Flavour and taste	Hardness
Control 20	preservative not added	5.60	5.40	708	good	normal
Control 21	calcium propionate 0.2%	5.62	5.42	686	acid adour sour taste	normal
Control 22	sodium acetate 0.4%	5.68	5.42	718	good	normal
Example 19	sodium acetate 0.4% plus coated mono sodium tartrate 0.4%	5.66	5.26	720	good	normal
Example 20	sodium acetate 0.4% plus coated monosodium fumarate 0.3%	5.68	5.28	720	good	normal

Next, the preservability of the product was tested by the procedure described in Example 1 with the results shown in Table 10.

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TABLE 10

Experiment	Additive	Number of Days Kept						
		2	3	4	5	6	7	8
Control 20	preservative not added	8/15	15/15					
Control 21	calcium propionate 0.2%					2/15	8/15	15/15
Control 22	sodium acetate 0.4%	9/15	15/15					
Example 19	sodium acetate 0.4% plus coated mono sodium tartrate 0.4%					3/15	9/15	15/15
Example 20	sodium acetate 0.4% plus coated monosodium fumarate 0.3%					2/15	10/15	15/15

Note: The acid salts in all cases were coated with a twofold amount of a hardened oil and the contents in all cases were such that their pH reducing capacity corresponded to that of 0.05% of fumaric acid.

We are aware of the "The Preservatives in Food Regulations 1962" No. 1532 and we make no claim to the use of the invention in contravention of said Regulations.

Subject to the foregoing disclaimer,

WHAT WE CLAIM IS:—

1. A method of making bread in which there is used a flour-containing dough comprising (1) 0.2 to 0.5% by weight, relative to the flour in the dough, of an acetate, and (2) an acid compound which is (a) an organic acid, (b) an acid salt of an organic acid or (c) an acid salt of an inorganic acid, and which is solid at room temperature, the acid compound being coated with a coating agent which is solid at room temperature but which melts under the conditions of baking of the dough, and the amount by weight, relative to the weight of flour in the dough, of (a), (b) and (c) present being, respectively, at least 0.03%, at least 0.06% and at least 0.045%.

2. A method according to claim 1 wherein the acetate is sodium, potassium, calcium, magnesium or ammonium acetate.

3. A method according to claim 1 or 2 wherein (a) is fumaric, citric, malic, succinic, adipic or tartaric acid.

4. A method according to claim 1 or 2 wherein (b) is mono-sodium tartrate, fumarate, citrate, malate, succinate or adipate.

5. A method according to claim 1 or 2

wherein (c) is sodium or calcium monohydrogen orthophosphate, sodium metaphosphate or potash alum.

6. A method according to any one of the preceding claims wherein the acid compound is coated with an animal or vegetable oil or fat, a monoglyceride, a diglyceride, or a wax.

7. A method according to claim 1 substantially as described in any one of the foregoing Examples.

8. Bread prepared by the method claimed in any one of the preceding claims.

9. A bread dough as defined in claim 1.

10. A dough according to claim 9 wherein the acetate is sodium, potassium, calcium, magnesium, or ammonium acetate.

11. A dough according to claim 9 or 10 wherein the acid compound is fumaric, citric, malic, succinic, adipic or tartaric acid, monosodium tartrate, fumarate, citrate, malate, succinate or adipate, sodium or calcium monohydrogen orthophosphate, sodium metaphosphate or potash alum.

12. A dough according to claim 9 substantially as described in any one of the foregoing Examples.

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